

CLAIMS

We claim:

5 1. A process for removing a pollutant through a foliar application, comprising the steps of:

growing a live fern plant selected from the group consisting of Pteridaceae, Adiantaceae, Aspleniaceae, Dryopteridaceae, and Oleandraceae, in an environment site containing the pollutant; and

10 removing a portion of the pollutant through foliar contact with a part of the live plant.

2. The process of claim 1, wherein the environment site includes: a contaminated aqueous solution.

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3. The process of claim 1, wherein the environment site includes: a contaminated water selected from at least one of: ground water and surface water.

4. The process of claim 1, wherein the environment site includes: a contaminated 20 wetlands.

5. The process of claim 1, wherein the environment sites includes: a contaminated soil.

6. The process of claim 1, wherein the environment site includes: a contaminated air.
7. The process of claim 6, wherein the contaminated air includes: the step of 5 contaminating the air environment by spraying the pollutant onto the plant part.
8. The process of claim 7, wherein the pollutant includes: arsenite.
9. The process of claim 7, wherein the pollutant includes: arsenate.

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10. The process of claim 1, wherein the live plant part includes: a live leaf portion.
11. The process of claim 10, wherein the pollutant portion includes approximately 110 to approximately 4610 mg/kg of arsenic concentration per live leaf portion.

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12. The process of claim 1, wherein the live plant part includes: a live stem portion.
13. The process of claim 12, wherein the pollutant portion includes approximately 20 110 to approximately 1,160 mg/kg of arsenic concentration per live stem portion.
14. The process of claim 1, wherein the live plant part includes: a live spore portion.

15. The process of claim 1, wherein the pollutant portion includes approximately 760 to approximately 3,710 mg/kg of arsenic concentration per live spore portion.
16. The process of claim 1, further comprising the step of:
 - 5 detoxifying the pollutant once inside of the plant.
17. The process, according to claim 1, wherein said fern plant is of the family Pteridaceae.
- 10 18. The process, according to claim 1, wherein said fern plant is of the family *Adiantaceae*.
- 15 19. The process, according to claim 1, wherein said fern plant is *Adiantum raddianum*.
- 20 21. The process, according to claim 1, wherein said fern plant is of the genus *Pteris*.
- 20 22. The process, according to claim 1, wherein said fern plant is *Pteris cretica* parkerii.
22. The process, according to claim 1, wherein said fern plant is a *Pteris cretica* albo-lineata.

23. The process, according to claim 1, wherein said fern plant is a *Pteris cretica* mayii.

24. The process, according to claim 1, wherein said fern plant is a *Pteris vittata*.

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25. The process, according to claim 1, wherein up to approximately 100% of arsenic in the environment site is being removed.

26. A process for removing a pollutant through an excised plant part, comprising
10 the steps of:

excising a part of a live fern plant selected from the group consisting of Pteridaceae, Adiantaceae, Aspleniaceae, Dryopteridaceae, and Oleandracea;
applying the excised plant part to an environment site containing the pollutant;
and

15 removing a portion of the pollutant through contact with the excised plant part.

27. The process of claim 26, wherein the excised plant part includes: an excised leaflet.

20 28. The process of claim 26, wherein the environment site includes: a contaminated aqueous solution.

29. The process of claim 26, wherein the environment site includes: a contaminated water selected from at least one of: ground water and surface water.

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30. The process of claim 26, wherein the environment site includes: a contaminated wetlands.

31. The process of claim 26, wherein the environment sites includes: a 5 contaminated soil.

32. The process of claim 26, wherein the environment site includes: a contaminated air.

10 33. The process of claim 32, wherein the contaminated air includes: the step of contaminating the air environment by spraying the pollutant onto the excised plant part.

34. The process of claim 26, wherein the pollutant includes: arsenite. 15

35. The process of claim 26, wherein the pollutant includes: arsenate.

36. The process of claim 26, wherein the pollutant portion includes: approximately 1,961 to approximately 4,066 mg/kg of arsenic per plant part. 20

37. The process, according to claim 26, wherein said fern plant is of the family Pteridaceae.

38. The process, according to claim 26, wherein said fern plant is of the family 25 *Adiantaceae*.

39. The process, according to claim 26, wherein said fern plant is *Adiantum raddianum*.

5 40. The process, according to claim 26, wherein said fern plant is of the genus *Pteris*.

41. The process, according to claim 26, wherein said fern plant is *Pteris cretica parkerii*.

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42. The process, according to claim 26, wherein said fern plant is a *Pteris cretica albo-lineata*.

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43. The process, according to claim 26, wherein said fern plant is a *Pteris cretica mayii*.

44. The process, according to claim 26, wherein said fern plant is a *Pteris vittata*.

20 45. The process, according to claim 26, wherein up to approximately 100% of arsenic in the environment site is being removed.

46. A process for removing a pollutant through ground plant part, comprising the steps of:

25 excising a part of a live fern plant selected from the group consisting of Pteridaceae, Adiantaceae, Aspleniaceae, Dryopteridaceae, and Oleandracea;

grounding the plant part into a ground biomass;
removing a portion of the pollutant through contact with the ground biomass.

47. The process of claim 46, wherein the plant part includes: a leaflet.

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48. The process of claim 46, wherein the ground biomass is: freshbiomass.

49. The process of claim 46, wherein the ground biomass is air-dried biomass.

10 50. The process of claim 46, wherein the ground biomass is freeze dried biomass.

51. The process of claim 46, wherein the pollutant includes: arsenite.

52. The process of claim 46, wherein the pollutant includes: arsenate.

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53. A biomass composition for removing pollutants, comprising:

ground up portions of a part of a fern plant selected from the group consisting of Pteridaceae, Adiantaceae, Aspleniaceae, Dryopteridaceae, and Oleandracea.

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